Lowell's misconception of the mathematical principles of the 'great circle' is fundamental. Does it render null and void his conclusion that the canals lie on arcs of great circles?

Mr. Lowell found that the surface markings on Mars came to the central meridian about twenty minutes later than the predicted time; a discrepancy, it should be said, to which Prof. Keeler called special attention in 1892.

To what extent Mr. Lowell's future observations will modify his map is uncertain. Drawings of Mars by different observers even on the same night and with the same telescope are proverbially different. So far as the drawings by the three Flagstaff observers have been published, the proverb still seems to be in force.

Mr. Lowell is entitled to great credit for devoting his private means so generously to establishing and conducting an observatory, and for his efforts in search of the best, but imperfect, atmospheric conditions. He is likewise fully aware of the necessity of making the observations continuously and systematically. Whatever advances Mr. Lowell may have made in Martian study, or may make in the future, will be fully accredited to him and warmly welcomed by all astronomers.

Mr. Lowell's book is written in a lively and entertaining style, and is printed and illustrated faultlessly. It is true that the theories advanced are mostly old ones, suggested by Schiaparelli, Pickering and others, many of them having been elaborated by Flammarion and others; but Mr. Lowell has presented them very fully and suggestively. Scientifically, the leading faults of the book are: First, that so elaborate an argument for intelligent life on the planet, embracing a complex system of seasonal changes, should be based upon observations covering only one-fourth of only one Martian year; and, secondly, that there should be so many evidences of apparent lack of familiarity with the literature of the subject.

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Text-book of the Embryology of Invertebrates. By Dr. E. Korschelt and Dr. K. Heider. Translated from the German by Edward L. Mark, Ph. D., and W. Mc. Woodworth, Ph. D., with additions by the authors and translators. Part I.: Porifera, Cnidaria, Ctenophora, Vermes, Enteropneusta, Echinodermata. New York: Macmillan & Co. 8vo. Pp. xv+484. 1895. $4.00.

The first Heft of the special part of Korschelt and Heider's well-known Lehrbuch, of which this is the English translation, appeared in 1890; the second Heft appeared in 1892 and the third in 1893. The three parts together form a volume of some fifteen hundred pages, illustrated by some nine hundred figures. They complete the special part of the work, that which presents the facts of embryology. A general part, to deal with theories and conclusions, is promised.

The first volume of Balfour's Comparative Embryology, dealing with invertebrates, appeared in 1890, and following that, the work of Korschelt and Heider was the first attempt at a 'broad and comprehensive' treatment of the whole field of invertebrate embryology. The book has been for several years in the hands of zoologists all over the world and is recognized as an excellent and indispensable reference book, the only one of its kind since Balfour. The labor involved in reading the special papers dealing with each group of animals treated and in sifting and arranging their results is so enormous, and the work of Korschelt and Heider has been so well done, that the book is likely for many years to remain without a rival. It is too well known to need critical treatment in this place.

The translation under consideration covers the first three hundred and twenty pages of the original. The remaining four-fifths of the book is to be rendered by another translator.

The German has been more freely rendered than in Mark's translation of Hertwig's Textbook of Embryology, and this gives the present book better literary form and makes it easier reading. At the same time the original has been so closely followed that nothing is lost or its meaning. The few instances where the English is not perfectly clear are not likely to confuse anyone who is prepared to read the book. Here are some of them: On p. 17 'differenten' is rendered by differentiated, which

does not express the meaning of the original and might mislead a careless reader. On p. 164, the German 'Kreuzweise gestellt' is rendered by 'placed crosswise,' which in English would nearly always be taken to mean 'placed across the long axis of the body,' though it might, in English, mean 'arranged in the form of a cross.' This is the meaning of the German.

On p. 191 the sentence beginning 'The embryo is now surrounded by' would be ambiguous if taken by itself, although it is entirely clear in the original. These instances and other similar ones are scarcely worth calling attention to in a work of such general excellence, and every zoologist has reason to be grateful to the translators for their self-sacrificing task.

The book is something more than a translation since both the authors and the translators have added to it numerous notes, which serve, for the most part, to call attention to the contributions that have appeared since the German editions were printed. These additions will be found particularly valuable to the specialist in directing his attention to the recent literature, but in most cases too brief to be of direct use to the student. The additions are distinguished from the original text by the use of brackets, and following each is an indication of its authorship. The authorship of these additions can be a matter of little interest to the readers of the book, and one could wish that the additions had been expanded and the text rewritten to accommodate them.

The translators have added to the lists of literature appendices, which include the literature which has appeared since the publication of the German edition and constitute a very important addition to the book. In matters of bibliography the papers issuing from the Zoological Laboratory of Harvard University have long been models and these appendices are no exception.

Finally the translators have added excellent indexes, subject and author.

The publishers have done their part of the work satisfactorily, and especially so with reference to the illustrations, most of which it would be difficult to distinguish from the originals.

JACOB REIGHARD.

Artistic and Scientific Taxidermy and Modelling. A manual of instruction in the methods of preserving and reproducing the correct form of all natural objects, including a chapter on the modelling of foliage. By MONTAGU BROWNE. London and New York: Macmillan & Co. 1896. $6.50.

It is something like twenty years since the appearance of Montagu Browne's Practical Taxidermy, a book of some 150 pages, and the present handsome volume of nearly thrice that size may be taken as representing the improvements in the art of taxidermy which the author considers to have taken place during the last twenty-five years. The book opens with a brief review of the origin and progress of taxidermy, next comes a short chapter on tools, and then follows a long and valuable section devoted to formulas for various killing, preservative, modelling and other compounds, most of which have been tested, and many of which have been devised by Mr. Browne. This chapter, which includes notes on the permanency of pigments, will prove most useful to both the amateur and professional preparator, for in it are brought together a host of recipes which, even when printed elsewhere, are scattered far and wide. Here, for example, are to be found many of the methods used in the preparation of the beautiful invertebrates sent out by the Naples Station, and here are formulas for making the gelatin casts which have come so much into vogue of late years. Few, however, will agree with Mr. Browne's wholesale denunciation of arsenic as a preservative, and fewer still will accept in its stead whiting and chloride of lime, much less pepper! Arsenic may be used with too free a hand, and exposure to light and air may go far towards preserving fur and feathers from the attacks of insect pests, but arsenic certainly prevents the ravages of Dermestes, and there is nothing like it for preserving intact ligamentary skeletons and the sterna of mammals. Especially is this true where hundreds of small 'rough skeletons' are of necessity kept in the duplicate series to be worked on as occasion demands.

From the chapter on collecting one infers that those useful articles, the auxiliary barrel and cyclone trap, have not found their way across